DOCUMENT RESUME

ED 246 934 JC 840 404

AUTHOR	Hector, Judith H.
TITLE	Establishing Cut-Off Scores for Placement in Community College Developmental Courses.
INSTITUTION	Walters State Community Coll., Morristown, TN.
PUB DATE	84
NOTE	20p.
PUB TYPE	Reports - Research/Technical (143)
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	Achievement Tests; Community Colleges; *Cutting Scores; *Educational Diagnosis; *Grade Prediction; Predictive Validity; *Remedial Programs; *Student Placement; Two Year Colleges; Two Year College Students
IDENTIFIERS	*Walters State Community College TN

ABSTRACT

To determine the effectiveness of placement test scores in predicting final course grades, students enrolled in selected college-level courses at Walters State Community College in Tennessee were tested during winter 1983. At the end of the quarter, course grades were collected, and correlations between test scores and course grades were calculated. Cut-off scores were determined to minimize the number of false positives (i.e., predicting failure when success would have occurred) and misses (i.e., predicting success when failure would result). Concerns about the distribution of headcount in college-level and developmental courses were also considerations in setting cut-off scores. In order to increase student and faculty acceptance of the use of test scores for placement purposes, a revised screening procedure was implemented for new student orientation and fall registration in 1983. A three-level system of cut-off scores was developed. Students below the STOP level were advised that they had little chance of success in courses related to the skills measured by the test; students with scores in the CAUTION level were advised to look at their high school performance and other factors before deciding on course selection; and students above the GO level seemed to have the skills needed to succeed. The revised screening procedure significantly increased developmental enrollments, and an analysis of the performance of students at various levels validated the cut-off scores. Screening materials and study data are appended. (AYC)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED246934

ESTABLISHING CUT-OFF SCORES FOR PLACEMENT IN COMMUNITY COLLEGE DEVELOPMENTAL COURSES

Judith H. Hector
Walters State Community College

1984

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
J. H. Hector

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it.
☒ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

JC 840 404

Introduction

Developmental or remedial programs for educationally underprepared students in higher education are widespread (Rouche and Snow, 1977). In order to retain these underprepared students in college, early identification, often by placement testing, and referral into developmental courses are needed.

Objectives

This paper describes the collection and analysis of data on the effectiveness of certain tests in predicting student success in college-level courses. First, the paper focuses on how to establish cut-off scores from this data for placement in community college developmental courses. Second, a program for screening entering community college students using the cut-off scores is described. Third, some follow-up data on the screening program are presented.

Perspective

In the 1960's and 1970's, open admissions policies and developmental education programs for underprepared students frequently were introduced simultaneously (Rouche, J.E., and Kirk, 1973). It was clear that

> open-admissions institutions on the postsecondary level must ensure that these students are given every opportunity to profit from attending college. They must be given the skills to ensure their staying in college long enough to profit (Pepper, 1978, p. 13).

The focus in the 1980's has shifted to quality and accountability as a result of criticism of community colleges. One criticism is that community colleges are increasing the enrollment of young adults, but losing up to 40% of them prior to graduation. Another criticism is that the academic performance of community college transfers to four-year colleges is declining (Eaton, 1982). These criticisms and others have led to increased emphasis on testing new students. There is a trend toward making developmental work mandatory for underprepared students as determined by test results (Schinoff, 1982).

Methods

Procedures

To determine the effectiveness of certain placement tests in predicting final course grades in selected college-level courses, students enrolled in these courses at Walters State Community College in Tennessee were tested during the first week of classes. At the end of the quarter, course grades were collected. Correlations between test scores

and course grades were calculated. Cut-off scores were determined in a way which minimizes two kinds of errors:

> (1) false positives, that is, predicting failure when success would have occurred; and (2) misses, that is, predicting success when failure is the result (Mehrens and Lehman, 1973, p. 133).

The procedure for establishing cut-off scores used scattergrams with test scores plotted against course grades and is described in a later section of this paper.

Data Source

Students enrolled in courses at the community college during winter quarter, 1983 were subjects in the study. The Elementary Algebra Skills Test (ALG) from the Descriptive Tests of Mathematics Skills was given to a total of 134 students in college algebra classes. The Nelson Denny Reading Test (ND) was given to a total of 211 students enrolled in first quarter psychology, sociology, and history classes. Two tests were given to first quarter English composition students. They were the Verbal portion of the School and College Ability Test (SCAT) and the Vocabulary portion of the Nelson Denny Reading Test.

Results and Conclusions

All correlations between test scores (predictor variables) and respective course grades (criterion variables)

except one were significantly different from zero ($p < .05$) and ranged from .21 to .54. The correlations are reported in Table 1. Though the algebra test correlation appears higher than the other correlations, tests to determine whether the algebra correlation was higher than the SCAT correlation or the Nelson Denny Total correlations revealed no significant differences. For English composition grades, the correlation for the SCAT Verbal Test was significantly higher than the correlation for the Nelson Denny Vocabulary Test ($p < .05$). This finding was of particular interest because the Nelson Denny Test is widely used for placement, but in this study the SCAT test was a better predictor of English composition grades.

Insert Table 1 about here

The primary purpose of the data collection was to establish cut-off scores to be used in screening students for developmental mathematics, writing, and reading courses. The cut-off scores were determined by organizing the data into scattergrams with grade (0.0, 1.0, 2.0, 3.0, and 4.0) on the vertical axis and test score on the horizontal axis. A horizontal line is drawn between a 2.0 grade and a 1.0

grade. Students who attain a 2.0 grade or better are seen as being successful in the course. The placement of the vertical line for the cut-off score depends on a value judgement to be made as to the relative cost of placing a student in a developmental course who could have succeeded in a college level course (false positive) or placing a student in a college level course who fails (miss). As an example, in Figure 1, the effect of setting a cut-off score

---

Insert Figure 1 about here

---

at 15 in algebra is seen. There is a rate of 9% false positives and 17% misses. Correct placement occurs for 74% of the students. In Figure 2, the cut-off score is

---

Insert Figure 2 about here

---

raised to 20. Correct placement occurs for 64% of the students, but 31% are false positives and 6% are misses. Similar scattergrams were constructed for the other course grades and test score combinations.

False positives can not be avoided. A few students perform badly on placement tests because they are anxious.

Older students may be rusty in a content area, score low, yet succeed in a course as the skills return through review. A cut-off score which allows a large number of false positives results in a delay of at least one quarter in a student's program of study because the student takes a developmental course when he or she could have succeeded in a college-level course. Misses delay a student's program at least two quarters. The student who enrolls in a college-level course and fails must then take a developmental course for at least a quarter before enrolling in the college-level course again. From the standpoint of wasted student time, it is logical to focus on reducing misses. The problem with this approach, however, is that it raises the cut-off score and lowers the number of students placed in college level courses. Concerns about the distribution of headcount in college-level and developmental courses are considerations in setting cut-off scores.

Use of Cut-Off Scores

Before 1983, the college had a limited screening program which had been set up when the college was established. Some students and some faculty did not believe that test scores were useful for placment purposes. A

revised screening procedure was implemented for summer new student orientation and fall registration of 1983. A three level system of cut-off scores was developed. The levels are named STOP, CAUTION, and GO. Students below the STOP level are advised that they have little chance of success in courses related to the skills measured by the test. Students with scores in the CAUTION level are advised to look at their high school performance and other factors before deciding on course selection. Students above the GO level seem to have the skills needed to succeed. Students are informed of what percentage of the students tested in this study at STOP, CAUTION, and GO levels succeeded in regular college courses. This information is presented in writing and on videotape to encourage the students to take the test results seriously. The form for reporting scores to students is in Appendix A. The college does not mandate placement in developmental courses at this time.

One immediate result of the revised screening procedure was a significant increase in enrollment in developmental courses indicating increased faculty and student acceptance of using cut-off scores. The overall increase in develop-

mental enrollment was 59% from fall, 1982 to fall, 1983. The greatest change was seen in developmental mathematics followed by reading and writing (see Table 2).

Table 2 about here

A follow-up was conducted to determine the acceptance of referrals to developmental courses for fall, 1983. Since placement in developmental courses is not mandatory, students may choose to delay taking a developmental course to a later quarter or to ignore the referral and enroll in a college-level course for which the cut-off score indicates they are not prepared. The data presented in Table 3 indicates that students are more likely to take a developmental course when they are at the STOP level in mathematics (47%) than in writing (41%) or in reading (31%).

Insert Table 3 about here

A further follow-up was conducted to determine the failure rate of students who were at the STOP level and who enrolled in a college level course anyway. Only six

students enrolled in college algebra after scoring at the STOP level. Three of those received below a C grade. Thirty-eight students were at the STOP level and enrolled in English composition. Twenty-one of those received below a C grade. The lack of success of these STOP level students supports the effectiveness of the cut-off score procedure. About 4% of the STOP level mathematics students ignored the referral and enrolled in college algebra. About 38% of the STOP level English students ignored the referral and enrolled in English composition. More work needs to be done on increasing the acceptance of referrals to developmental writing.

The follow-up for students who were at the STOP level in reading involved examining overall grade point averages at the end of fall quarter, 1983 since there is no one course in which students who ignore a developmental referral in reading might enroll. Seventy-eight students ignored the referral. Sixty percent of them earned a G.P.A. below 2.0. The mean grade for the group was 1.77. Thirty-five students accepted the referral to Basic Reading. Forty-six percent of them received a G.P.A. below 2.0. The mean grade for the group was 1.92. It

seems that students at the STOP level in reading have a higher G.P.A. and a better rate of earning a 2.0 or above if they enroll in Basic Reading.

Summary

The data collected in this study supports the conclusion that cut-off scores can be established which accurately place students in developmental courses. Better communication of the meaning of cut-off scores to students and faculty advisors increased enrollment in developmental courses. There is still a reluctance on the part of the students to accept referrals in English and reading. Further study is needed on the issue of mandatory placement in developmental courses. A second area for further study is the evaluation of tests other than those used in this study as screening devices. The rate of correct placement in college algebra is higher for the algebra test than the rates for the other screening tests. Other tests for English and reading may do a better job of minimizing false positives and misses.

References

Eaton, J.S. Judging community colleges: Look at student success. Community and Junior College Journal, September, 1982, 16-21; 45.

Mehrens, W.A. & Lehman, I.J. Measurement and evaluation in education and psychology. New York: Holt, Rinehart and Winston, Inc., 1973.

Pepper, J.D. Remedial education at the college level: Is it effective or desirable? Community College Frontiers, Spring, 1978, 12-17.

Rouche, J.E. & Kirk, R.W. Catching up: Remedial education. San Francisco: Jossey-Bass Publishers, 1973.

Rouche, J.E. & Snow, J.J. Overcoming learning problems. San Francisco: Jossey-Bass Publishers, 1977.

Schinoff, R.B. No nonsense at Miami-Dade. Community and Junior College Journal, November, 1982, 34-35; 44-45.

Appendix A

Name _____
Last First Middle

Social Security Number _____

Major _____

Dear New Student:

We would like you to get a good start at Walters State. It is frustrating to begin a course far behind the other students, to struggle, and to fail. On the other hand, it is a waste of your time to register for a course which repeats what you already know. To help you make good decisions about what you are prepared to study at Walters State, we have tested students to see what entering skill level is needed to ensure success. In reading, English, and mathematics you will be given a test. After you receive the results of the tests, match them to one of the following:

STOP—Take a developmental course to get the background you need. Students with your test score usually fail a college-level course requiring the skills in the test.

CAUTION—Maybe you should take a developmental course or maybe, with hard work, you would succeed in a college-level course requiring the skills in the test. What were your high school grades?
A's and B's - Try the college-level course
C's and below - Take a developmental course

GO—You'll need to study, do the homework, and attend class, but you seem to have the needed background.

PLEASE DISCUSS YOUR SCORES WITH YOUR ADVISOR.

Mathematics

Arithmetic Test
(For people with less than 2 years of H.S. algebra or less than 1 year of H.S. algebra and 1 year of H.S. geometry)

Percentile Rank

_____ 0-37th %-tile **STOP** - Take DVS 0710 to review arithmetic

_____ 42-65th %-tile **CAUTION** - Be sure you can compute accurately with fractions, decimals, and percent. If not, take DVS 0710 before MAT 1200 Math for Health Sciences, MAT 2310 Math for El. Teachers, or DVS 0720 Basic Math (Algebra)

_____ 70-99th %-tile **GO** - You'll probably be OK in MAT 1200, MAT 2310, but you must have DVS 0720 - DVS 0730 before MAT 1310 or MAT 1400

Algebra Test
(For people with at least 2 years of H.S. algebra or 1 year of H.S. algebra and 1 year of H.S. geometry)

Percentile Rank

_____ 0-12th %-tile **STOP** - Take DVS 0720 to learn algebra. Only 22% of students in this level get a C or better in MAT 1310

_____ 14-28th %-tile **CAUTION** - You need 1 year of H.S. algebra and a second year of math with C or better grades for MAT 1310 or MAT 1400. Only about 40% of students in this level get a C or better in MAT 1310.

_____ 33-99th %-tile **GO** - Read the prerequisites of the course you want to take

Reading

Many college-level courses such as history, psychology, and sociology require a reading level of 12th grade or higher. The textbooks are often written on the 14th or 15th grade level. Look at your Nelson Denny Total Score Grade Level.

_____ 9 9 grade level and below	**STOP** - Take REA 0410 Basic Reading. Few students with 9th grade and below reading level get a C or better in reading-oriented courses.
_____ 10 1 to 10 9 grade level	**CAUTION** - Did you get a C or better in high school classes involving reading? If not, take REA 0410. About 50% of students in this level or below get a C or better in college-level courses involving reading.
_____ 11th grade level and above	**GO** - Your reading level is probably adequate to handle college-level work.

English

The SCAT test measures verbal ability and vocabulary. Students who score low on the SCAT test often have trouble in ENG 1010 writing on a topic in an organized manner, with appropriate work choices, with correct grammar, with correct spelling, and according to manuscript rules.

_____ 0-20th %-tile	**STOP** - Take DVS 0510, 0520, or 0530 Basic Communications. The courses may be taken in any order according to the time that fits your schedule. Without DVS you have only a 30% chance of getting a C or better in ENG 1010.
_____ 23-29th %-tile	**CAUTION** - Have you written much recently? Was it well-organized and grammatical? If not, take DVS 0510, 0520 or 0530. Students who score in this range have a 30% to 42% chance of chance of getting a C or better in ENG 1010.
_____ 32-99th %-tile	**GO** - You seem to have the verbal ability to get a C or better in ENG 1010 if you do the work.

WSCC 02514-48030 Rev 7 83

Table 1
Correlations between Test Scores and Course Grades

Test	Course	Number of Students	Correlation	p
ALG	College Algebra	134	.54	.0001
SCAT	Composition	163	.48	.0001
ND VOC	"	151	.35	.0001
ND TOTAL	Sociology	88	.34	.0012
ND COMP	"	88	.21	.0446
ND VOC	"	88	.35	.0005
ND TOTAL	Psychology	97	.34	.0006
ND COMP	"	97	.25	.0121
ND VOC	"	97	.36	.0003
ND TOTAL	History	26	.39	.0480
ND COMP	"	26	.44	.0240
ND VOC	"	26	.31	.1253

Note on Test Names:
ALG (Descriptive Test-Elementary Algebra)
ND (Nelson Denny)
TOTAL (Total Score)
COMP (Comprehension)
VOC (Vocabulary)

Figure 1
Scattergram of Grade by Algebra Test Score
Cut-off Score of 15

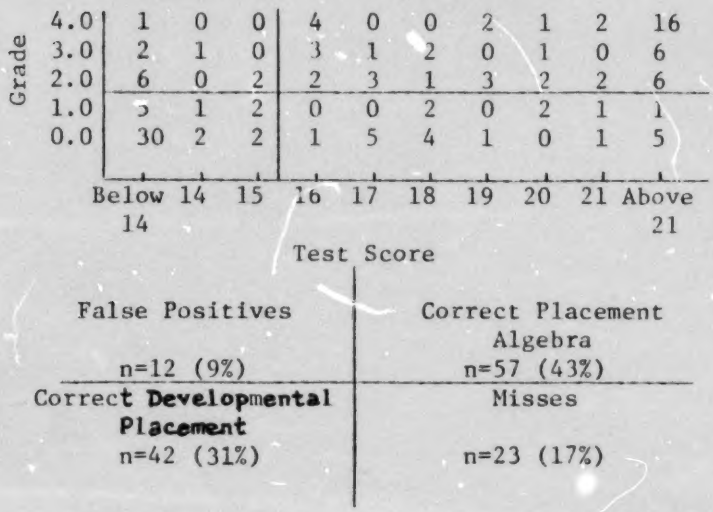
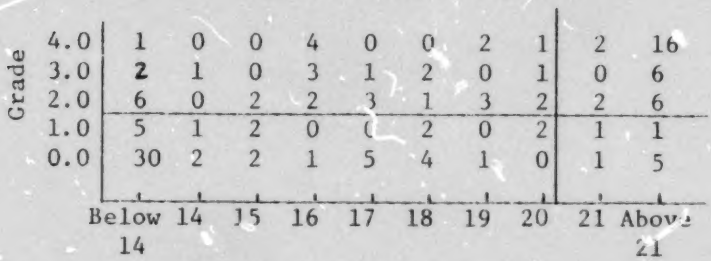


Figure 2
Scattergram of Grade by Algebra Test Score
Cut-off Score of 20



False Positives	Correct Placement Algebra
n=41 (31%)	n=28 (21%)
Correct Developmental Placement	Misses
n=57 (43%)	n=8 (6%)

Table 2
Number of Students in Developmental Courses

	Fall 82	Fall 83	% Change
Mathematics	160	275	+72%
Reading	40	61	+53%
Writing	80	110	+38%

Table 3
Number of Students at STOP Level
Who Accepted Developmental Referral

	At Stop Level	Enrolled in a Developmental Course	% Accepting Referral
Mathematics	153	72	47%
Writing	100	41	41%
Reading	113	35	31%

ERIC® CLEARINGHOUSE FOR
JUNIOR COLLEGES
UNIVERSITY OF CALIFORNIA

SEP 07 1984

8118 Math-Sciences Building
Los Angeles, California 90024